

CLAIMS

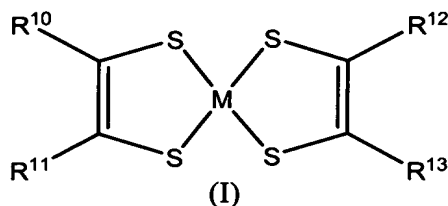
1. A stabilized ink composition comprising an IR-absorbing metal-dithiolene dye and a singlet oxygen quencher.

2. The ink composition of claim 1, wherein said IR-absorbing metal-dithiolene dye is preselected to minimize visible absorption by reducing cofacial interactions between adjacent dye molecules.

3. The ink composition of claim 1, which is a water-based inkjet ink.

4. The ink composition of claim 1, wherein the singlet oxygen quencher is selected from ascorbic acid, 1,4-diazabicyclo-[2.2.2]octane (DABCO), sodium azide, histidine or tryptophan.

5. The ink composition of claim 1, wherein the metal-dithiolene dye is of formula (I):



wherein:

M is selected from Ni, Pd or Pt;

R¹⁰ and R¹¹ are independently selected from C₁₋₃₀ hydrocarbyl, or R¹⁰ and R¹¹ together are joined to form a C₁₋₃₀ hydrocarbylene group; and

R¹² and R¹³ are independently selected from C₁₋₃₀ hydrocarbyl, or R¹² and R¹³ together are joined to form a C₁₋₃₀ hydrocarbylene group.

6. The ink composition of claim 5, wherein at least one of R¹⁰, R¹¹, R¹² or R¹³ comprises a hydrophilic group.

7. The ink composition of claim 5, wherein said hydrophilic group is selected from a PEG chain; an ammonium group; an acid group, including salts thereof; or a sulfonamide group.

8. The ink composition of claim 7, wherein said hydrophilic group is a sulfonic acid group or a metal salt thereof.

9. The ink composition of claim 7, wherein said hydrophilic group is -SO₃Na or -SO₃K.

10. The ink composition of claim 5, wherein at least one of R^{10} , R^{11} , R^{12} or R^{13} comprises a moiety suitable for reducing cofacial interactions.

11. The ink composition of claim 10, wherein said moiety suitable for reducing cofacial interactions is a
5 bridged cyclic group.

12. The ink composition of claim 10, wherein R^{10} and R^{11} together are joined to form a bridged cyclic group.

13. The ink composition of claim 10, wherein R^{12} and R^{13} together are joined to form a bridged cyclic group.
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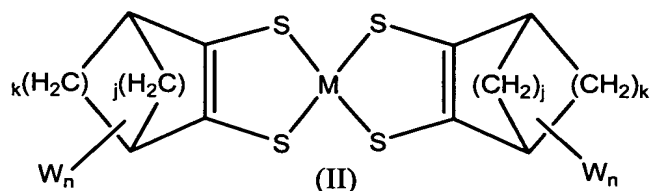
14. The ink composition of claim 10, wherein the moiety for reducing cofacial interactions is a polymeric group.

15. The ink composition of claim 10, wherein the polymeric group is a dendrimer.
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16. The ink composition of claim 10, wherein the polymeric group includes a PEG chain.

17. The ink composition of claim 1, wherein M is Ni.

20 18. The ink composition of claim 1, wherein the metal-dithiolene dye is of formula (II):



wherein:

25 M is selected from Ni, Pd or Pt;

j is selected from 0, 1, 2, 3 or 4;

k is selected from 0, 1, 2, 3 or 4;

n is selected from 0, 1, 2 or 3;

W is a hydrophilic group;

30 up to three $-(CH_2)-$ groups in the carbocycle may be optionally replaced by a group independently selected from $-C(O)-$, $-NH-$, $-S-$, $-O-$;

up to three $-CH-$ groups in the carbocycle may be optionally replaced by $-N-$;

up to four H atoms in the carbocycle may be optionally replaced by a group independently selected from C₁₋₆ alkyl, C₁₋₆ alkoxy, C₅₋₁₂ aryl, C₅₋₁₂ arylalkyl, halogen, hydroxyl or amino; and provided that at least one of j or k is greater than 0.

- 5 19. The ink composition of claim 18, wherein M is Ni.
20. The ink composition of claim 18, wherein j is 1 and k is 2.
21. The ink composition of claim 18 comprising a $-(C_{1-4} \text{ alkyl})_2-$ bridging group.
- 10 22. The ink composition of claim 18, wherein n is 1.
23. The ink composition of claim 18, wherein W is selected from a substituent comprising a PEG chain; a substituent comprising an ammonium group; a substituent comprising an acid group, including salts thereof; or a
- 15 substituent comprising a sulfonamide group.
24. The ink composition of claim 18, wherein W is of formula $-(CH_2)_t-SO_3Z$, wherein t is 0 or an integer from 1 to 6, and Z is H or a water-soluble cation.
- 20 25. The ink composition of claim 18, wherein W is of formula $-CH_2SO_3H$, $-CH_2SO_3Na$ or $-CH_2SO_3K$.
26. An inkjet printer comprising a printhead in fluid communication with at least one ink reservoir, wherein said at least one ink reservoir comprises an inkjet ink according to claim 3.
- 25 27. The inkjet printer of claim 26, wherein said printhead comprises:
 - a plurality of nozzles;
 - a bubble forming chamber corresponding to each of the nozzles respectively, the bubble forming chambers adapted to contain ejectable liquid; and
 - a heater element disposed in each of the bubble forming chambers
- 30 respectively, the heater element configured for thermal contact with the ejectable liquid; such that,
 - heating the heater element to a temperature above the boiling point of the ejectable liquid forms a gas bubble that causes the ejection of a drop of the ejectable liquid from the nozzle; wherein,
 - the heater element is suspended in the ink chamber such that during use at least a portion of the heater
- 35 element is encircled by, and in direct contact with, the ejectable fluid.
28. An ink cartridge for an inkjet printer, said ink cartridge comprising an inkjet ink according to claim 3.

29. The ink cartridge of claim 28, wherein said cartridge is replaceable.

30. The ink cartridge of claim 28, wherein said cartridge comprises:

a housing defining a plurality of storage areas wherein at least one of the storage areas contains colorant for printing information that is visible to the human eye and at least one of the other storage areas contains an inkjet ink according to claim 22.

31. The ink cartridge of claim 30, wherein each storage area is sized corresponding to the expected levels of use of its contents relative to the intended print coverage for a number of printed pages.

32. A substrate having an ink composition according to claim 1 disposed thereon.

33. The substrate of claim 32, wherein said ink composition is disposed in the form of coded data.

34. The substrate of claim 32 comprising an interface surface and wherein the coded data is disposed over a substantial portion of said interface surface.

35. The substrate of claim 32, which is a paper sheet, a label, a tag, a packaging material or a product item.

36. A method of enabling entry of data into a computer system via a printed form, the form containing human-readable information and machine-readable coded data, the coded data being indicative of an identity of the form and of a plurality of reference points of the form, the method including the steps of:

receiving, in the computer system and from a sensing device, indicating data regarding the identity of the form and a position of the sensing device relative to the form, the sensing device, when placed in an operative position relative to the form, generating the indicating data using at least some of the coded data;

identifying, in the computer system and from the indicating data, at least one field of the form; and

interpreting, in the computer system, at least some of the indicating data as it relates to the at least one field,

wherein said coded data comprises an ink composition according to claim 1.

37. The method of claim 36 in which the at least one field is associated with at least one zone of the form, the identifying step including identifying that the position of the sensing device is within the at least one zone.

38. The method of claim 37 in which the indicating data includes movement data regarding movement of the sensing device relative to the form, the sensing device generating the movement data using at least some of the coded data, the identifying step including identifying that the movement of the sensing device is at least partially within the at least one zone.

39. A method of enabling entry of data into a computer system via a printed form, the form containing human-readable information and machine-readable coded data, the coded data being indicative of at least one field of the form, the method including the steps of:

5 receiving, in the computer system and from a sensing device, indicating data regarding the at least one field and including movement data regarding movement of the sensing device relative to the form, the sensing device, when moved relative to the form, generating the data regarding said at least one field using at least some of the coded data and generating the data regarding its own movement relative to the form; and

10 interpreting, in the computer system, at least some of said indicating data as it relates to said at least one field,

wherein said coded data comprises an ink composition according to claim 1.

40. The method of claim 39 in which the sensing device generates the movement data using at least some of the coded data.

41. The method any one of claims 37, 38 and 39 in which the at least one field is a text field and the interpreting step includes converting at least some of the movement data to text.

42. The method any one of claims 37, 38 and 39 in which the at least one field is a drawing field.

43. The method any one of claims 37, 38 and 39 in which the at least one field is a checkbox field and the interpreting step includes interpreting at least some of the movement data as a check mark.

44. The method any one of claims 37, 38 and 39 in which the at least one field is a signature field and the interpreting step includes verifying that at least some of the movement data represents a signature of a user associated with the sensing device.

45. The method of claim 36 or claim 39 in which the at least one field is an action field and the interpreting step includes sending a message to an application associated with the action field.

46. The method of claim 45 in which the action field is a form submission action field and the message includes form data derived from at least one other field of the form.

47. A method of enabling entry of data into a computer system via a product item, the product item having a printed surface containing human-readable information and machine-readable coded data, the coded data being indicative of an identity of the product item, the method including the steps of:

- (a) receiving, in the computer system and from a sensing device, indicating data regarding the identity of the product item, the sensing device, when placed in an operative position relative to the product item, generating the indicating data using at least some of the coded data; and
 - (b) recording, in the computer system and using the indicating data, information relating to the product item,
- 5 wherein said coded data comprises an ink composition according to claim 1.

48. A method of enabling retrieval of data from a computer system via a product item, the product item having a printed surface containing human-readable information and machine-readable coded data, the coded data being indicative of an identity of the product item, the method including the steps of:

- 10 (a) receiving, in the computer system and from a sensing device, indicating data regarding the identity of the product item, the sensing device, when placed in an operative position relative to the product item, generating the indicating data using at least some of the coded data;
 - (b) retrieving, in the computer system and using the indicating data, information relating to the product item; and
 - 15 (c) outputting, from the computer system and to an output device, the information relating to the product item, the output device selected from the group comprising a display device and a printing device,
- wherein said coded data comprises an ink composition according to claim 1.

20 49. The method of claim 47 or 48 in which the coded data is formed from a plurality of coded data portions, each coded data portion being indicative of the identity of the product item.

50. The method of claim 47 or 48 in which the coded data is indicative of at least one of a UPC and an EPC associated with the product item.

25 51. The method of claim 36 or 39 in which the form is disposed on a surface of a product item and in which the coded data is indicative of an identity of the product item.

52. The method of claim 51 in which the coded data is formed from a plurality of coded data portions, each coded data portion being indicative of the identity of the product item.

30 53. The method of claim 51 in which the coded data is indicative of at least one of a UPC and an EPC associated with the product item.

35 54. The method of any one of claims 36, 39, 47 or 48 in which the coded data is substantially invisible to an unaided human eye.